

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method for allocating bandwidth of a data network to a plurality of data streams, comprising:

specifying apportionment of the bandwidth to a plurality of data classes, wherein each class of the plurality of data classes corresponds to a node in a hierarchical policy tree;

receiving a plurality of data streams;

~~wherein each data stream of the plurality of data streams has at least one attribute that corresponds to one of the data classes of the plurality of data classes;~~

determining a particular data class that corresponds to a particular data stream;

wherein one or more other data streams that are associated with the particular data class are currently being transmitted;

determining a plurality of acceptable transfer rates for the particular data stream;

negotiating a transfer rate for the particular data stream from the plurality of acceptable transfer rates;

wherein negotiating a transfer rate for the particular data stream includes selecting a transfer rate that (a) does not exceed the bandwidth apportioned to the particular data class that is not being used by the one or more other data streams, and (b) does not cause the transfer rates of the one or more other data streams to go below minimum acceptable transfer rates of the one or more other data streams; and

transmitting the particular data stream on the data network at the negotiated transfer rate;

detecting termination of the particular data stream;

in response to detecting termination of the particular data stream, determining whether another data stream from said particular data class is able to use bandwidth that

was allocated to said particular data stream;

in response to detecting that no data stream from said particular class is able to use

bandwidth that was allocated to said particular data stream, performing the steps of

(a) selecting an existing data stream based, at least in part, on where the node that

corresponds to the data class of the existing data stream is, within the

hierarchical policy tree, relative to where the node of said particular class

is, within said hierarchical policy tree; and

(b) increasing the bandwidth allocated to said existing data stream.

2. (previously presented) The method of claim 1 wherein the step of receiving comprises steps of:

receiving stream annotations associated with each of the data streams;

using a stream annotation associated with the particular data stream to select a plug-in

of a plurality of plug-ins; and

activating the plug-in to receive each data stream.

3. (cancelled)

4. (currently amended) The method of claim 1 wherein the step of transmitting comprises steps of:

transforming the information content within the particular data stream to the negotiated transfer rate; and

transmitting the data stream on the data network at the negotiated transfer rate.

5. (previously presented) The method of claim 4 wherein the step of transforming comprises a step of thinning, transcoding or decimating the particular data stream to the negotiated transfer rate.

6. (previously presented) The method of claim 1 wherein the transfer rate is a first transfer rate, the method further comprising steps of:

determining an amount of unallocated bandwidth on the data network;

negotiating a second transfer rate for a first data stream, wherein the second transfer rate uses the unallocated bandwidth;

transforming the first data stream to the negotiated second transfer rate; and

transmitting the first data stream on the data network at the second transfer rate.

7. (previously presented) The method of claim 6 further comprising steps of:

receiving a second data stream;

determining a second data class that corresponds to the second data stream;

negotiating a third transfer rate for the first data stream, wherein the third transfer rate is limited to the bandwidth apportioned to the particular data class;

negotiating a fourth transfer rate for the second data stream, wherein the fourth transfer rate is limited to the bandwidth apportioned to the second data class; and

transmitting on the data network, the first data stream at the third transfer rate and the second data stream at the fourth transfer rate.

8-20 (cancelled)

21. (currently amended) In a data network configured to transmit data streams at negotiated transfer rates, ~~wherein each of a plurality of data streams has at least one attribute that associates the data stream with a particular data class, and~~ wherein a negotiated transfer rate is limited to bandwidth apportioned to ~~the data class~~ one of a plurality of data classes ~~[[of a]]~~ for each data stream, ~~[[the]]~~ an improvement comprising:

each class of the plurality of data classes corresponding to a node in a hierarchical policy tree;

allocating bandwidth to the data streams by negotiating a transfer rate for each of the plurality of data streams from a plurality of acceptable transfer rates, the plurality of acceptable transfer rates provided by plug-ins prior to transmitting each data stream at the negotiated transfer rate;

detecting termination of a particular data stream;

in response to detecting termination of the particular data stream, determining whether another data stream from said particular data class is able to use bandwidth that was allocated to said particular data stream;

in response to detecting that no data stream from said particular class is able to use bandwidth that was allocated to said particular data stream, performing the steps of
(a) selecting an existing data stream based, at least in part, on where the node that corresponds to the data class of the existing data stream is, within the

hierarchical policy tree, relative to where the node of said particular class is, within said hierarchical policy tree; and

(b) increasing the bandwidth allocated to said existing data stream.

22. (currently amended) A system for allocating bandwidth of a data network to a plurality of data streams, the system comprising:

means for specifying apportionment of the bandwidth to a plurality of data classes;

means for receiving a plurality of data streams;

means for determining a particular data class that corresponds to a particular data stream,

wherein each class of the plurality of data classes corresponds to a node in a hierarchical policy tree;

means for determining a plurality of acceptable transfer rates for the particular a data stream;

means for negotiating a transfer rate for the particular data stream, wherein the transfer rate is a selected one of the plurality of acceptable transfer rates;

~~wherein negotiating a transfer rate for the particular data stream includes a means for~~

~~selecting a transfer rate that (a) does not exceed wherein the transfer rate is limited to the bandwidth apportioned to the particular data class that is not being used by the one or more other data streams of the plurality of data stream, and (b) does not cause the transfer rates of the one or more other data streams to go below minimum acceptable transfer rates of the one or more other data streams associated with each data stream;~~

~~wherein the negotiated transfer rate is limited to a portion of the bandwidth apportioned to~~

a the data class; and

means for transmitting the particular data stream on the data network at the negotiated transfer rate

means for detecting termination of the particular data stream;

in response to detecting termination of the particular data stream, means for determining

whether another data stream from said particular data class is able to use

bandwidth that was allocated to said particular data stream;

in response to detecting that no data stream from said particular class is able to use

bandwidth that was allocated to said particular data stream, means for performing

the steps of

(a) selecting an existing data stream based, at least in part, on where the node that

corresponds to the data class of the existing data stream is, within the

hierarchical policy tree, relative to where the node of said particular class

is, within said hierarchical policy tree; and

(b) increasing the bandwidth allocated to said existing data stream.

23. (currently amended) A method for allocating bandwidth of a data network to a plurality of data streams, comprising:

apportioning the bandwidth to a plurality of data classes;

receiving a plurality of data streams ~~wherein each data stream has at least one attribute~~

~~that associates the data stream~~ each associated with one of the plurality of data

classes, wherein each class of the plurality of data classes corresponds to a node

in a hierarchical policy tree;

from a plurality of acceptable transfer rates, negotiating a transfer rate for each data stream, wherein the transfer rate is limited to the bandwidth apportioned to the data class associated with each data stream; and

transmitting the data streams on the data network at the negotiated transfer rates;

~~receiving a particular data stream associated with a particular data class for which a particular amount of bandwidth has been apportioned;~~

~~determining that the particular amount of bandwidth is not sufficient for forwarding said particular data stream on said data network;~~

~~in response to determining that the particular amount of bandwidth is not sufficient,~~

~~determining whether the bandwidth associated with at least one other data class is currently unused; and~~

~~in response to determining that bandwidth associated with the at least one other data class is currently unused, performing the steps of:~~

~~dynamically reallocating bandwidth from the at least one other data class to the particular data class; and~~

~~forwarding the particular data stream on said data network;~~

detecting termination of the particular data stream;

in response to detecting termination of the particular data stream, determining whether another data stream from said particular data class is able to use bandwidth that was allocated to said particular data stream;

in response to detecting that no data stream from said particular class is able to use bandwidth that was allocated to said particular data stream, performing the steps of

(a) selecting an existing data stream based, at least in part, on where the node that corresponds to the data class of the existing data stream is, within the hierarchical policy tree, relative to where the node of said particular class is, within said hierarchical policy tree; and

(b) increasing the bandwidth allocated to said existing data stream.

24. (currently amended) A method for allocating bandwidth of a data network to a plurality of data streams, comprising:

specifying apportionment of the bandwidth to a plurality of data classes;

receiving a plurality of data streams for a plurality of plug-ins;

wherein each plug-in of the plurality of plug-ins is associated with a data class of the plurality of data classes;

wherein each data stream ~~is associated with~~ ~~has at least one attribute that associates the data stream~~ with one of the plurality of data classes;

wherein each class of the plurality of data classes corresponds to a node in a hierarchical policy tree;

from a plurality of acceptable transfer rates for each associated plug-in, negotiating a transfer rate for each data stream;

wherein the transfer rate of the data stream for each plug-in is limited to the bandwidth apportioned to the data class associated with the particular plug-in; and

transmitting the data streams on the data network at the negotiated transfer rates;

detecting termination of the particular data stream;

in response to detecting termination of the particular data stream, determining whether

another data stream from said particular data class is able to use bandwidth that was allocated to said particular data stream;

in response to detecting that no data stream from said particular class is able to use bandwidth that was allocated to said particular data stream, performing the steps of

(a) selecting an existing data stream based, at least in part, on where the node that corresponds to the data class of the existing data stream is, within the hierarchical policy tree, relative to where the node of said particular class is, within said hierarchical policy tree; and

(b) increasing the bandwidth allocated to said existing data stream.